



## *X-Plain™* *Arrhythmia*

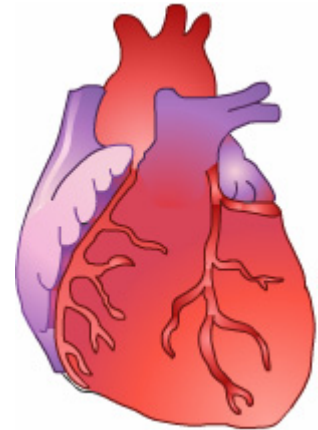
### **Reference Summary**

#### **Introduction**

Cardiac arrhythmia is an irregularity of the heart beat that causes the heart to beat too slowly, too fast, or irregularly.

There are different types of arrhythmias. Most arrhythmias are not particularly dangerous. However, some may be life threatening and do require immediate medical attention.

The treatment of cardiac arrhythmias may require long-term medications or electroshock to the heart. Rarely, surgical procedures are necessary in order to implant pacemakers or defibrillators.



This reference summary explains what arrhythmia is. It also covers the causes, symptoms, diagnosis, and treatment options of arrhythmia.

#### **The Heart**

Understanding how the heart works helps to understand arrhythmias. The heart is the most important muscle in the body.

The heart has 2 sides; the right side and the left side.

Each side of the heart has 2 chambers: an atrium and a ventricle.

After the body uses oxygen that is in the blood, the blood enters the heart through the right atrium.

The right atrium contracts and blood is pumped to the right ventricle.

The right ventricle contracts and the blood is pumped to the lungs.

In the lungs, the blood is loaded with the oxygen that we breathe.

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From the lungs, the oxygen-rich blood goes to the left atrium.

The left atrium contracts and the blood is pumped to the left ventricle.

The left ventricle contracts and the blood is pumped to the whole body through the biggest artery, the aorta.

In the body, the organs and tissues take oxygen from the blood.

Finally, the blood goes back to the right atrium and the whole cycle starts again.

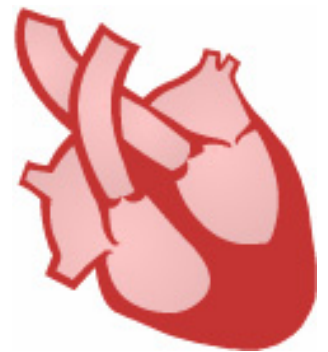
Heart contractions are synchronized. First the atria contract together, and then the ventricles contract together. A normal heart rate at rest is usually between 60 and 100 beats per minute.

The muscles of the heart contract and pump blood because a small electric current activates them. The electric current starts in a place inside the heart called the sinus node. It causes the atria to contract and pump blood to the ventricles.

From the sinus node, the electric current travels through fibers that are like electric cables, to another area of the ventricles called the atrio-ventricular node, or AV node.

From the AV node, the electric current goes to the ventricles and causes them to contract and pump blood.

The heart can pump as fast as 150 beats per minute in response to physical or emotional stress. It can also slow down to 50 beats a minute while a person is at rest.



Different people have different heart rates during physical activity or at rest. This is normal, as long as the blood pressure does not drop too low due to an increase or decrease in heart rate. The blood pressure is generated by heart contractions.

## Cardiac Arrhythmia

Cardiac arrhythmia is the name for different conditions that cause the heart to beat:

- Too fast
- Too slow
- Irregularly

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An abnormally fast heart rate is called tachyarrhythmia because “tachy” means fast in Greek.

An abnormally slow heart rate is called bradyarrhythmia because “brady” means slow in Greek.

Other irregular heart rates are simply called arrhythmias.

There are different reasons for arrhythmias. Arrhythmias may occur if:

- The sinus node is not able to generate enough heartbeats
- The rhythm of the sinus node becomes abnormal
- If other areas in the atria take over the function of the sinus node

Other arrhythmias occur because there is an interruption in the electrical wiring of the heart, causing the ventricles to beat separately from the atria.

In the worst case, the ventricles are not able to beat effectively, creating a condition called ventricular fibrillation. When this happens, the heart cannot pump blood and the patient dies quickly. The most common reason for sudden death is ventricular fibrillation.

## Symptoms

When the heart rate becomes irregular, a person might feel any of the following sensations in their chest:

- Palpitations
- Throbbing
- Pounding
- Thumping
- Fluttering
- A feeling like the heart skipped a beat

In serious arrhythmias, people sometimes feel dizzy or faint.

Chest pain and shortness of breath may also be experienced with an irregular heart rate.

It is important to know how to check your own pulse. You can find your pulse on the inside of your wrist, on the edge closest to the thumb. With the index and second

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finger of your other hand, count how many beats you can feel in 15 seconds. Multiply that number by 4 to get your heart rate per minute.

As you count, make sure that the beats are evenly spaced without any skipping.

## **Causes**

Cardiac arrhythmias have many causes. Some people are born with an irregular heart rate.

Other people might have arrhythmias if they consume tobacco, alcohol, or caffeine. Illegal drugs could also induce arrhythmias.

Some people develop arrhythmias from taking diet pills or cold medicine.

Heart disease can also cause arrhythmias. Common reasons for arrhythmias are heart attacks and an enlarged heart due to high blood pressure.

Some medical conditions, such as an over-functioning thyroid gland, can also lead to arrhythmias.

## **Types & Risks**

There are several types of arrhythmias. Arrhythmias that start in the atria are called atrial arrhythmias. Those that start in the ventricles are called ventricular arrhythmias. Ventricular arrhythmias are usually more dangerous than atrial ones.

Most arrhythmias are not dangerous. However, if a person feels an abnormal heart beat and thinks it could be an arrhythmia, they should check with a doctor.

Some types of arrhythmias can be deadly. These are mostly the ones associated with heart disease.

The reason some arrhythmias are dangerous is because an irregular heart rate can disrupt the heart's ability to pump enough blood. This could lead to decreased blood pressure, which could lead to death.

Blood pressure may not be affected in some kinds of arrhythmias. However, the blood may not be totally pumped out with every beat, which could cause blood clots to form in the chambers of the heart. This is especially true with a certain type of arrhythmia called atrial fibrillation; in atrial fibrillation the atria quiver rather than contract.

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Blood clots formed in the chambers of the heart could break loose and travel to the brain, which could result in a stroke.

## Diagnosis

After a careful medical history and physical examination, the doctor may order other tests to figure out whether a patient has arrhythmias and, if so, which type.

Cardiac arrhythmias are diagnosed with an electro-cardiogram, also called an EKG. This test takes only a few minutes. During an EKG, electrodes are placed on the chest and body to record the heart's electrical impulses.



Since some cardiac arrhythmias come and go, nothing abnormal may be noticed during an EKG. If this is the case, the patient may be asked to wear a portable EKG called a Holter monitor. A Holter monitor records the electrical impulses of the heart for 24 hours, just like an EKG would.

If arrhythmia occurs every few days or few weeks, the patient could wear a recording device. When the patient feels an arrhythmia, he or she activates the device to record an EKG. The recorded information is then transmitted by phone to the doctor for analysis. This is called trans-telephonic monitoring.

A doctor may ask a patient to exercise while an EKG is taken. This is known as a stress EKG.

It is important to find out what is causing cardiac arrhythmia. In order to do so, a doctor would check the heart, blood pressure, blood sugar, and levels of thyroid hormones.

The doctor might also request an electrophysiologic study, or EPS. During this procedure, the doctor inserts a very thin tube into a blood vessel of an arm or leg and pushes it all the way to the heart. The doctor can then study what is causing the arrhythmia and what medications could be used to treat it.

If the doctor is very worried about the arrhythmias, he or she may decide to admit the patient to the hospital and monitor their heart rate there.

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## Treatment

The treatment of cardiac arrhythmias depends on the type of arrhythmia and its seriousness. Many types of arrhythmias do not require treatment.

If a person's heart skips beats, he or she may be asked to cut down on caffeine. Sometimes this is all that needs to be done to restore the heart's normal rhythm.

In other cases, medication may be enough to keep the heart rate in a normal rhythm and at a normal rate.

Sometimes blood thinners are needed to prevent blood clots from forming in the heart. Controlling high blood pressure can also help.

If none of the above treatments is able to improve cardiac arrhythmia, other procedures may be tried. Your doctor may try to reset your heart rate by giving electric shocks; this is called cardioversion or electroversion.

Sometimes arrhythmias are caused from areas of the heart that are over-active. If this is the case, the doctor may insert a thin tube through the blood vessels to the heart and destroy the electrical pathways causing the over-stimulation. This is called radiofrequency ablation.

For cases where the heart rate is too slow, a pacemaker may be inserted to keep the heart rate at a certain level.

For cases where the heart rate is too fast, a defibrillator may be surgically implanted. The defibrillator can sense when the heart is going dangerously fast. When that happens it delivers an electrical shock to the heart to return the heart beat to normal.

In some cases of arrhythmia, patients may be placed on long-term medication to prevent it from happening again.

## Prevention

The best way to prevent serious cardiac arrhythmia from developing is to keep your heart healthy. The following 10 tips can help you to keep your heart healthy.

1. Do not smoke.
2. Be physically active, under your doctor's supervision.
3. Eat a healthy, balanced diet that is rich in fibers and low in fat.
4. Check the level of cholesterol in your blood. If it is high, get it under control.

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5. Check your blood pressure regularly. If it is high, keep it under control.
6. Lose weight if you are overweight.
7. Exercise regularly.
8. Check the level of sugar in your blood. If it is high, keep it under control.
9. Get enough sleep at night.
10. Manage stress in your life.

If you have heart disease, talk with your doctor before starting an exercise program or a weight loss program.

## **Summary**

Cardiac arrhythmia is an irregular heart rhythm. There are many types of arrhythmias. Many are not dangerous.

Some cardiac arrhythmias can cause sudden death or blood clots that could travel from the heart to the brain, causing a stroke. For this reason, people who feel an abnormal heart beat should check with their doctor.

Thanks to advances in medicine, various treatment options are available for cardiac arrhythmias.

Adopting healthy lifestyle habits to keep your heart strong can help to prevent arrhythmias from developing or progressing.

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